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ECONOMIC VALUATION OF WETLAND BIODIVERSITY: A COMPARATIVE STUDY OF RURAL AND URBAN WETLANDS OF WEST BENGAL



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Abstract

The present study was devoted to delineate the significance of economic valuation of wetland-based biodiversity. This study attempted to achieve this objective by estimating the willingness to pay for the conservation and management of two selected wetlands of West Bengal. Along with this it tried to delineate factors which influence it. The comparative analysis of the two selected wetlands was undertaken to capture and explain differences and similarities in wetland values on different socio-economic and locational grounds. One of the most important factors which have heavily contributed to degradation of wetlands is the lack of understanding of their economic, ecological and socio-cultural values among all the stakeholders. Even smaller rural wetlands can generate considerable amount of economic values (welfare) and other use and non-use values. Respondents' of East Kolkata Wetland (EKW) willingness to pay ranges from Rs. 90 to Rs. 1800 per-year with a mean of around Rs. 410 per year (Rs. 34/month) whereas respondents' of Kachan Wetland Willingness to Pay (WTP) ranges from Rs. 50 to Rs. 1400 per-year with a mean of around Rs. 286 per year (Rs. 23/month).

Aggregate WTP for improvement of EKW was computed as Rs. 84,050, and for Kachan Rs.58, 630. Even though in monetary terms the value was not quite high due to the poor surrounding society of the wetlands. But given acceptance rate of the hypothetical preventive treatment interventions are highly desired and demanded in the study area which also provides important policy signals regarding the conservation and management of natural resources.

KEYWORDS: Wetland Biodiversity, Contingent Valuation Method, Conservation, Willingness to Pay

INTRODUCTION:

Economic valuation of wetland biodiversity is indeed a complex issue and no universal approach is available which could only estimate the economic value of biodiversity. The status of wetlands and wetland-based biodiversity in West Bengal, are quite disquieting and dismal despite much hue and cry about the need for their preservation and management for sustainable uses. Among various reasons poverty, increasing pressure from population and additional demand for land for agriculture and development activities, unsustainable consumption of wetland resources, lack of policy and regulatory measures and lack of understanding of wetlands' economic importance have made the situation very complex especially in case of rural wetlands. Most of the studies conducted to value wetlands in India are on larger wetlands like Ramsar sites or nationally important wetlands. These projects were policy oriented and large donor-funded research projects. But thousands of smaller wetlands across West Bengal are largely ignored in policy and research. There is no clear-cut policy which deals with the problem of management and preservation of smaller wetlands. People's Willingness to Pay (WTP) for conservation of wetland-biodiversity depends in socio-economic, demographic and behavioural characteristics of the respondents. On that basis we have selected two wetlands from West Bengal out of which one is Urban (East Kolkata wetland) and another is Rural (Kachan wetland) for our study. Firstly, the East Kolkata Wetlands (Urban), which is located on the eastern periphery of Kolkata city, is one of the biggest assemblages of sewage fed fish ponds which are stretched over an area of 12,500 ha. This wetland uphold the world's biggest and oldest integrated resource recovery practice based on a combination of agriculture and aquaculture, which provide livelihood support to a large, economically underprivileged population of around 27,000 families which depend upon the various wetland goods and services, primarily fish and vegetables for sustenance (Kundu et. al 2008). Due to its huge ecological and socio cultural importance, the Government of India, declared East Kolkata Wetlands as Wetland of International Importance under Ramsar Convention in 2002 (East Kolkata Wetland, News Letter, Volume I, 2010). Secondly, the Kachan wetland (Rural) which is located in the Uttar Dinajpur district of West Bengal. The Kachan wetland supports the food of a large number of people through natural resource use.

The multifunctional wetland ecosystem comprises fisheries, small agricultural plots and vegetable farms. Besides, there are some built up areas also. The goods and services provided by this wetland include, in addition to fisheries, habitat for waterfowl and housing for a large flora and fauna. The conversion in Kachan wetland has both ways effect on environment as well as on the livelihood of people living in the wetland area. Loss of Kachan wetland and its surrounding area is definitely a threat to the local biodiversity.

Wetland valuation is still at its infancy for West Bengal, and especially for a case like the present study on rural and urban wetlands on a comparative basis. It was a modest effort from our side to understand the economic importance of the selected wetlands keeping in mind its larger policy perspective. Against this backdrop a comparative analysis of the two selected wetlands (East Kolkata

and Kachan) was undertaken to capture and explain differences and similarities in wetland values on different socio-economic and locational ground.

The specific objectives of the present study were to:

- Examine dependence of local people (dwellers in and around the wetland) on East Kolkata(Urban) and Kachan(Rural) wetland;
- Calculate Willingness to Pay of the dwellers for a hypothetical protection and conservation of the East Kolkata and Kachan wetland;
- Determine impact of socio-economic and other determinants of households on their WTP for the proposed conservation scheme for East Kolkata and Kachan wetland;
- Compare the Willingness to Pay of the dwellers of the East Kolkata and Kachan wetland;
- Suggest policy measures.

An Overview Of Methodology And Data Sources:

The selected wetlands have potential for non-use values such as option value, passive value or bequest value. There are hundreds of identified or unidentified species of birds, reptiles, fishes, plants and trees and micro-organisms which can have a high non-user value. Without understanding non-use values an economic valuation of wetland biodiversity cannot be appropriate. On that ground we chose a contingent valuation survey for the present study to estimate the willingness to pay for the conservation of the selected wetland ecosystems (biodiversity).

For any survey-based study identifying the target population is the first task after setting up the basic goals of the study. As the present study aims to estimate the willingness to pay for the conservation and protection of the selected wetlands and their biological resources, Contingent Valuation Method (CVM) has been used for this purpose. It would be more appropriate to set the target population for sampling for this CV study on geographical basis as suggested by many experts. It means that the target population for East Kolkata Wetland (EKW) is the people from the South 24 Pargana and its neighbouring areas and for Kachan Wetland it should ideally be people of Goalpokhar-II and its neighbouring areas. We chose households on purely random basis and interviewed a responsible person (male or female) from each household. The present study of CVM used a sample size of total 410 households; where 205 had been selected from East Kolkata Wetland and 205 had been selected from Kachan wetland.

CVM is a survey based or stated preference technique, where a hypothetical market situation is created to elicit the households maximum willingness to pay (WTP) for the improvement of Kachan and East Kolkata Wetland by using the Open-ended question format. In that case there is a need to construct a well-defined hypothetical market mechanism under which the said resource would be valued.

For the present study we provided a brief introduction of the economic valuation of wetland biodiversity and a proposed "Wetland Biodiversity Management and Conservation Fund" in front of the respondents to know their willingness for the conservation and management of the wetland in question.

Results and Discussions:

Willingness to Pay for East Kolkata and Kachan Wetland improvement scheme and welfare estimates:

East Kolkata and Kachan wetland has potential use and non-use values. People living in and around the wetlands obtained not only livelihood for their sustenance but also generate huge source of

income and employment. Thus, it is, therefore, imperative to use the wetlands in a sustainable manner. In the present study, CVM was used to estimate the conservation and management value of wetland by using open-ended questionnaire format for elicitation of responses of WTP (yes/no) and other related questions. The analysis done on the basis of responses from two main questions asked during CV survey i.e. "Are you willing to pay for conservation scheme for EKW?" and "How much you are willing to pay for it?" showed 62 % of the respondents (benefitted from the use values of the EKW) were WTP for its improvement. Respondents' willingness to pay ranges from Rs. 90 to Rs. 1800 per-year with a mean of around Rs. 410 per year (Rs. 34/month). Whereas, 49% of the respondents (benefitted from the use values of the Kachan) were WTP for its improvement. Respondents' willingness to pay ranges from Rs. 50 to Rs. 1200 per-year with a mean of around Rs. 286 per year (Rs. 23/month). Aggregate WTP for improvement of EKW was computed as Rs. 84,050, and for Kachan Rs.58, 630 which was calculated by multiplying mean WTP by total number of sampled households. Even though in monetary terms the value was not quite high due to the poor surrounding society of the wetland. But given 62% and 49 % acceptance rate of the hypothetical preventive treatment interventions are highly desired and demanded in the study area. However, about 38% respondents (from EKW) and 51% respondents (from Kachan) among the sample of (205) were not willing to pay any amount (zero values) for proposed improvement or conservation programme. Almost in all the CV studies a proportion of respondents gave various reasons for not paying any amount for such programmes of environmental goods and services (Bradley et al. 2001). In the present study, households gave multiple reasons for rejecting to pay for proposed project are shown in table 1.

Table: 1. Reason for not willing to pay by Respondents of East Kolkata and Kachan Wetland

Wetlands Reasons	East Kolkata Percent	Kachan Percent
Financed out of national and international funds	33.3	32.7
Residents have right to use	6.7	6.3
Paying taxes to the government	11.8	11.2
Lack of Management	3.1	1.0
Do not trust govt. Sponsored management	45.1	48.8
Total	100.0	100.0

Source: Field Survey Data (2015)

It shows that around 33.3% (EKW) and 32.7% (Kachan) respondents were not WTP because, they believed that it is funded by national and international organizations. People said wetland is a public good and it is government's duty to maintain and improve quality of the wetland. About 6.7% (EKW) and 6.3% (Kachan) of households from the present study are not willing to pay as they were the residents of that place and they have the right to use the resources of that wetland. Almost all the households living in and around the wetland were paying some taxes or fees to government and consider that it should be used for lake's betterment. Against this backdrop, about 11.8%(EKW) and 11.2% (Kachan) said that they were already paying taxes to government for this purpose and 3.1% (EKW) and 1% (Kachan) respondents not willing to pay because of lack of management. About 45.1% (EKW) and 48.8% (Kachan) of the sampled households did not trust any management scheme.

Comparison of other characteristics of CVM Results of East Kolkata and Kachan Wetland

Although it was not possible to directly compare economic values of two different wetlands which were on many grounds different to each other but the present study hypothesized that their similarities in biodiversity, attributes, etc. a comparison of their economic values would indeed help us in many ways for dealing with complex policy related to management, conservation and better uses of the wetland resources. This in turn can generate larger societal welfare out of numerous wetlands both

in rural and urban area. The present section is devoted to this comparison. The results found from the CV studies on EKW and Kachan wetland have also many similarities and differences which can be compared and contrasted on various grounds:

Psychology and Attitudes of Respondents towards Biodiversity: The survey surprisingly reported a higher level of concern and Positive attitude towards biodiversity. About 60.5% (EKW) and 55.5% (Kachan) of the sampled respondents were very much concerned about the biodiversity of East Kolkata and Kachan wetland. Among other respondents 17.4% (EKW) and 19.6% (Kachan) were concerned and 22.1% (EKW) and 24.9% (Kachan) are mildly concerned. It implies that people were concerned about environment and understand the need for its management and preservation in both wetlands.

Table: 2. Comparison of respondents Psychology & Attitude towards Environment/Biodiversity of East Kolkata and Kachan Wetland

Psychology	Percent(EKW)	Percent(Kachan)
Very concerned	60.5	55.5
Concerned	17.4	19.6
Mildly Concerned	22.1	24.9
Total	100	100

Source: Field Survey Data (2015)

Causes of Degradation and Improvement Suggestions for EKW and Kachan Wetland

Linkage between economy and natural environment is quite obvious (Das et al. 2000). Every economic action can have some effect on environment and every environmental change can have some impact on economy. As long as human beings counter cause and effect relationship between economy and environment, this will reduce the secular downfall in the quality of natural resources. However, if the deterioration of environment goes beyond certain level where it is not even possible to regenerate it, additional costs may have to be incurred to make them more amenable. This will impose a huge burden not only on present but future generations also. In the present study, it has been observed that there exists a causal relationship between degradation of wetland and benefits derived from it through various economic activities by the surrounding population. It is evident from the perceptions of households that large biological diversity and crystalline water quality was present before man-made conversion of wetland and other anthropogenic pressures started increasing beyond assimilative capacity of the lake. According to the local people, different variety of fishes, birds and other types of aquatic animals are now reduced remarkably. Majority of respondents 22.6% (EKW) and 12.2% (Kachan) stated that wetland degradation was caused by pollution by dwellers. About 17.4% (EKW) and 8.3% (Kachan) respondents said that drains inclusion from Periphery, 15.4% (EKW) and 27.8% (Kachan) claim encroachment, 16.4% (EKW) and 19.0% (Kachan) claims excess fishing by the fishermen and 14.4% (EKW) and 10.2% (Kachan) respondents said mismanagement by Govt., 3.1% (EKW) and 3.9% (Kachan) said not applicable and 10.8% (EKW) and 18.5% (Kachan) said weeding was the cause of degradation.

Table: 3. Comparison of reasons for Degradation of the State of Biodiversity of East Kolkata and Kachan Wetland

Reasons	Percent(EKW)	Percent(kachan)
Pollution by Dwellers	22.6	12.2
Drains Inclusion from Periphery	17.4	8.3
Encroachment	15.4	27.8
Excess Fishing	16.4	19.0
Mismanagement by Govt	14.4	10.2
NA	3.1	3.9
Weeding	10.8	18.5
Total	100.0	100.0

Source: Field Survey Data (2015)

Respondents opined that if the causes for degradation of the wetlands were not ameliorated, it will ultimately lead to the death of these wetlands. Multiple suggestions for wetland's improvement were given by the sampled households (see table 4). Out of 205 respondents, 29.2% (EKW) and 8.8% (Kachan) respondents suggested for stopping pollution while 12.8%(EKW) and 29.3% (Kachan) suggested for controlling encroachment and 9.8%(EKW) and 11.3% (Kachan) suggested for de-weeding the lake. According to them, these were the main causes for deteriorating water quality and producing obnoxious smells from the wetland. Other suggestions reported are in the table below:

Table: 4. Comparison of Suggestion to improve the Environmental Quality and Biodiversity of Kachan and East Kolkata Wetland

Suggestions	Percent(EKW)	Percent(Kachan)
Awareness	13.3	11.2
Boundary Fencing	6.2	7.4
Deweeding	9.8	11.3
Govt. Initiative	9.7	12.7
NA	2.6	2.4
Staff for Cleaning	3.5	4.9
Stop Drains Inclusion	3.1	2.4
Stop Encroachment	12.8	29.3
Stop excess fishing	9.7	9.8
Stop Pollution	29.2	8.8
Total	100.0	100

Source: Field Survey Data (2015)

Many households were willing to shift and resettle outside the periphery of wetland and cited different and multiple reasons for it. Revealed reasons are shown in the Table: 5. Around 64% (EKW) and 54% (Kachan) respondents were willing to shift from the wetland area as they feel that the wetlands are full with difficulties. Other reasons like lack of facilities (like roads connectivity, hospitals, sanitary system) were revealed by 67% (EKW) and 48% (Kachan) respondents and about 23% (EKW) and 41% (Kachan) respondents are willing to shift due to lack of government jobs or other incentives.

Table: 5. Comparison of Reason for willingness to shift from East Kolkata and Kachan Wetland

Reason	Percent(EKW)	Percent(Kachan)
Land with Full of difficulties	64.00	54.00
Govt.Job	23.00	41.00
Lack of Facilities	67.00	48.00

Source: Field Survey Data (2015)

People still have multiple reasons for living in the wetland even though they face number of problems as has been shown in Table 6. Majority of the respondents 46%(EKW) and 95%(Kachan) said that they got livelihoods from it, 33%, 30% , 25% (EKW) and 5%, 40%, 45%(Kachan) respondents said employment, ancestral place and residential place respectively were the main reasons for residing in the wetland.

Table: 6. Comparison of Reason for living in of Kachan and East Kolkata Wetland

Reason	Percent(EKW)	Percent(Kachan)
Ancestral Place	30.00	40.00
Residential Place	25.00	45.00
Employment	33.00	5.00
Livelihood	46.00	95.00

Source: Field Survey Data (2015)

CONCLUSION:

Conservation and preservation of wetlands especially in rural areas is very difficult task because of the problem of allocation of wetland resources. Present study is an effort to aware the conservation value of wetland. The study highlighted that people were willing to pay for its conservation even though having low economic status. WTP of households was directly influenced by economic, ecological and other socio-cultural values. Despite obtaining huge benefits from the wetland, households claimed that wetlands' current status is far from satisfactory. Hence its preservation, overall development and sustainable management should be an important policy objective and a national priority. There is need for designing area-specific policy tools which may also help for efficient and better management of wetlands. Economic valuation studies should be undertaken for wetland-based resources like biodiversity to estimate their economic, ecological and other socio-cultural values on priority basis.

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